Patent

Attorney Docket No. 895,675-007

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

NAIR et al.

Serial No. 10/647,971

Filed: August 25, 2003

For: SYSTEM AND METHOD OF CHARACTERIZING VASCULAR TISSUE

Group Art Unit: 3737

Examiner: Francis Jaworski

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to 37 C.F.R. §1.56 and in accordance with 37 C.F.R. §§1.97–1.98, information relating to the above–identified application is hereby disclosed. The accompanying Form PTO/SB/08A provides a listing of documents that may be relevant to the subject application.

It is requested that the Examiner fully consider the art cited in the accompanying Form PTO/SB/08A, initial the left–most column of the form adjacent each cited reference, and return a copy for Applicants' records. It is further requested that the art be cited on the cover of any patent issuing from the subject application.

This IDS is believed to be timely in that it is being submitted under 37 CFR § 1.97(b), that is (1) within three months of the filing date of the application, which is not a continued

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prosecution application filed under § 1.53(d); or (2) within three months of entry of the national stage as set forth in 37 CFR § 1.491; or (3) before the mailing of a first Office action on the merits; or (4) before the mailing of a first Office action after filing a request for continued examination under § 1.114. Thus, no fee is required.

This statement should not be construed as a representation that more material information does not exist or that an exhaustive search of the relevant art has been made. Nor does this statement constitute an admission by Applicants or Applicants' agent that the information provided herein is necessarily prior art to Applicants' invention. Moreover, Applicants reserve the right to establish the patentability of the claimed invention over any of the listed documents should they be applied there–against as references. . Please charge any deficiency or credit any overpayment to Deposit Account No. 50-2862.

Respectfully submitted,

O'MELVENY & MYERS LLP

Dated: 8/24/05 By _____

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Sheet 1 of 3

Complete if Known	
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First Named Inventor	NAIR et al
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Examiner Name	Francis Jaworski
Attorney Docket Number	895,675-007

Examiner Initials *	U.S. Patent Document Number	Kind Code[2] (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY
	5,638,823		Akay	06/17/1997
	6,659,953		Sumanaweera	12/09/2003
	2005/0124881		Kanai	06/09/2005

Examiner Initials*	Foreign Patent Document Office[3]	Number[4]	Kind Code[5] (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	T_6
	JP	2002-074957		Kanai	03/15/2002	

Examiner Initials *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume–issue number(s), publisher, city and/or country where published.	T [2]
	AYDIN, N., PADAYACHEE, S., MARKUS, H., "The Use of the Wavelet Transform to Describe Embolic Signals", Ultrasound in Medicine and Biology, 1999, pp. 953-958, Vol. 25, No. 6, Elsevier, New York, U.S.A.	
	BALDEWECK, T., LAUGIER, P., HERMENT, A., BERGER, G., "Application of Autoregressive Spectral Analysis for Ultrasound Attenuation Estimation: Interest in Highly Attenuating Medium", IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, 1995, pp. 99-110, Vol. 42, No. 1, Institute of Electrical and Electronics Engineers, New York, U.S.A.	
	BOOKSTEIN, F., "Principal Warps: Thin-Plate Splines and the Decomposition of Deformations", IEEE Transactions on Pattern Analysis and Machine Intelligence, 1989, pp. 567-585, Vol. 11, No. 6, IEEE Computer Society, New York, U.S.A.	
	BOOKSTEIN, F., Morphometric Tools for Landmark Data: Geometry and Biology, 1991, pp. 55-87, Cambridge University Press, Cambridge, England	
	BRIDAL, S., FORNES, P., BRUNEVAL, P., BERGER, G., "Correlation of Ultrasonic Attenuation (30 to 50 MHz) and Constituents of Atherosclerotic Plaque", Ultrasound in Medicine and Biology, 1997, pp. 691-703, Vol. 23, No. 5, Elsevier, New York, U.S.A.	
	BRIDAL, S., BEYSSEN, B., FORNES, P., JULIA, P., BERGER, G., "Development of Noninvasive Parametric Imaging of Atherosclerotic Plaque", IEEE Ultrasonics Symposium, 1998, pp. 1595-1598, Institute of Electrical and Electronics Engineers, Piscataway, U.S.A.	
	BRIDAL, S., TOUSSAINT, J., RAYNAUD, J., FORNES, P., LEROY-WILLIG, A., BERGER, G., "US Backscatter and Attenuation 30 to 50 MHz and MR T2 at 3 Tesla for Differentiation of Atherosclerotic Artery Constituents In Vitro", IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, 1998, pp. 1517-1525, Vol. 45, No. 6, Institute of Electrical and Electronics Engineers, New York, U.S.A.	
	CHERIN, E., SAIED, A., LAUGIER, P., NETTER, P., BERGER, G., "Evaluation of Acoustical Parameter Sensitivity to Age-Related and Osteoarthritic Changes in Articular Cartilage Using 50-MHz Ultrasound", Ultrasound in Medicine and Biology, 1998, pp. 341-354, Vol. 24, No. 3, Elsevier, New York, U.S.A.	
	CINCOTTI, G., LOI, G., PAPPALARDO, M., "Frequency Decomposition and Compounding of Ultrasound Medical Images with Wavelet Packets", IEEE Transactions on Medical Imaging, 2001, pp. 764-771, Vol. 20, No. 8, Institute of Electrical and Electronics Engineers, New York, U.S.A.	
	DAUBECHIES, I., "Wavelet Transforms and Orthonormal Wavelet Bases", Proceedings of Symposia in Applied Mathematics, 1993, pp. 1-33, Vol. 47, American Mathematic Society, Providence, U.S.A.	
	DE KROON, M., VAN DER WAL, L., GUSSENHOVEN, W., RIJSTERBORGH, H., BOM, N., "Backscatter Directivity and Integrated Backscatter Power of Arterial Tissue", International Journal of Cardiac Imaging, 1991, pp. 265-275, Vol. 6, No. 3-4, Nijhoff, Boston, U.S.A.	
	GEORGIOU, G., COHEN, F., "Tissue Characterization Using the Continuous Wavelet Transform Part I: Decomposition Method", IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, 2001, pp. 355-363, Vol. 48, No. 2, Institute of Electrical and Electronics Engineers, New York, U.S.A.	
	GEORGIOU, G., COHEN, F., PICCOLI, C., FORSBERG, F., GOLDBERG, B. "Tissue Characterization Using the Continuous Wavelet Transform Part II: Application on Breast RF Data", IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, 2001, pp. 364-373, Vol. 48, No. 2, Institute of Electrical and Electronics Engineers, New York, U.S.A.	

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Group Art Unit	3737
Examiner Name	Francis Jaworski
Attorney Docket Number	895,675-007

Examiner Initials *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume–issue number(s), publisher, city and/or country where published.	T [2]
	GUSSENHOVEN, E., ESSED, C., LANCEE, C., MASTIK, F., FRIETMAN, P., VAN EGMOND, F., REIBER, J., BOSCH, H., VAN URK, H., ROELANDT, J., BOM, N., "Arterial Wall Characteristics Determined by Intravascular Ultrasound Imaging: An In Vitro Study", Journal of the American College of Cardiology, 1989, pp. 947-952, Vol. 14, No. 4, Elsevier Biomedical, New York, U.S.A.	
	GUSSENHOVEN, E., FRIETMAN, P. THE, S., VAN SUYLEN, R., VAN EGMOND, F., LANCEE, C., VAN URK, H., ROELANDT, J., STIJNEN, T., BOM, N., "Assessment of Medial Thinning in Atherosclerosis by Intravascular Ultrasound", The American Journal of Cardiology, 1991, pp. 1625-1632, Vol. 68, No. 17, Cahners Publising Company, Newton,U.S.A.	
	JEREMIAS, A., KOLZ, M., IKONEN, T., GUMMERT, J., OSHIMA, A., HAYASE, M., HONDA, Y., KOMIYAMA, N., BERRY, G., MORRIS, R., YOCK, P., FITZGERALD, P., "Feasibility of In Vivo Intravascular Ultrasound Tissue Characterization in the Detection of Early Vascular Transplant Rejection", Circulation, 1999, pp. 2127-2130, Vol. 100, No. 21, American Heart Association, Dallas, U.S.A.	
	KAWASAKI, M., TAKATSU, H., NODA, T., ITO, Y., KUNISHIMA, A., ARAI, M., NISHIGAKI, K., TAKEMURA, G., MORITA, N., MINATOGUCHI, S., FUJIWARA, H., "Noninvasive Quantitative Tissue Characterization and Two-Dimensional Color-Coded Map of Human Atherosclerotic Lesions Using Ultrasound Integrated Backscatter-Comparison Between Histology and Integrated Backscatter Images", Journal of the American College of Cardiology, 2001, pp. 486-492, Vol. 38, No. 2, Elsevier, New York, U.S.A.	
	KAWASAKI, M., TAKATSU, H., NODA, T., SANO, K., ITO, Y., HAYAKAWA, K., TSUCHIYA, K., ARAI, M., NISHIGAKI, K., TAKEMURA, G., MINATOGUCHI, S., FUJIWARA, T., FUJIWARA, H., "In Vivo Quantitative Tissue Characterization of Human Coronary Arterial Plaques by Use of Integrated Backscatter Intravascular Ultrasound and Comparison with Angioscopic Findings", Circulation, 2002, pp. 2487-2492, Vol. 105, No. 21, American Heart Association, Dallas, U.S.A.	
	LIZZI, F., GREENEBAUM, M., FELEPPA, E., ELBAUM, M., COLEMAN, D., "Theoretical Framework for Spectrum Analysis in Ultrasonic Tissue Characterization", Journal of the Acoustical Society of America, 1983, pp. 1366-1373, Vol. 74, No. 4, American Institute of Physics for the Acoustical Society of America, New York, U.S.A.	
	LIZZI, F., ASTOR, M., FELEPPA, E., SHAO, M., KALISZ, A., "Statistical Framework for Ultrasonic Spectral Parameter Imaging", Ultrasound in Medicine and Biology, 1997, pp. 1371-1382, Vol. 23, No. 9, Elsevier, New York, U.S.A.	
	LOCKWOOD, G., RYAN, L., HUNT, J., FOSTER, F., "Measurement of the Ultrasonic Properties of Vascular Tissues and Blood from 35-65 MHz", Ultrasound in Medicine and Biology, 1991, pp. 653-666, Vol. 17, No. 7, Elsevier, New York, U.S.A.	
	MARPLE, S., Digital Spectral Analysis with Applications, 1987, pp. 136-144, 154-158, 198-202, 457—458, Prentice-Hall, Inc., Englewood Cliffs, U.S.A.	
	MOORE, M., SPENCER, T., SALTER, D., KEARNEY, P., SHAW, T., STARKEY, I., FITZGERALD, P., ERBEL, R., LANGE, A., MCDICKEN, N., SUTHERLAND, G., FOX, K., "Characterisation of Coronary Atherosclerotic Morphology by Spectral Analysis of Radiofrequency Signal: In Vitro Intravascular Ultrasound Study with Histological and Radiological Validation", Heart, 1998, pp. 459-467, Vol. 79, No. 5, BMJ Publishing Group, London, England	
	NAIR, A., Comparison of the Ability of Spectral Algorithms to Predict Atherosclerotic Plaque Composition with Radio Frequency Intravascular Ultrasound Data", Masters Thesis, cataloged on Case Western Reserve University library system April 9, 2001, pp. 1-127, Case Western Reserve University, Cleveland, U.S.A.	
	QIAN, S., CHEN, D., "Joint Time-Frequency Analysis", IEEE Signal Processing Magazine, 1999, pp. 52-67, Vol. 16, Institute of Electrical and Electronics Engineers, New York, U.S.A.	
	RASHEED, Q., NAIR, R., SHEEHAN, H., HODGSON, J., "Correlation of Intracoronary Ultrasound Plaque Characteristics in Atherosclerotic Coronary Artery Disease Patients with Clinical Variables", The American Journal of Cardiology, 1994, pp. 753-758, Vol. 73, No. 11, Cahners Publising Company, Newton,U.S.A.	
	ROHR, K., STIEHL, H., SPRENGEL, R., BUZUG, T., WEESE, J., KUHN, M., "Landmark-Based Elastic Registration Using Approximating Thin-Plate Splines", IEEE Transactions on Medical Imaging, 2001, pp. 526-534, Vol. 20, No. 6, Institute of Electrical and Electronics Engineers, New York, U.S.A.	
	SANTOSH, K., TOBOCMAN, W., HAACKE, E., IZEN, S., "In Vivo Biomicroscopy with Ultrasound", Ultrasonics, 1987, pp. 274-282, Vol. 25, No. 5, Butterworth & Co., Guildford, England	
	SANTOSH, K., TOBOCMAN, W., HAACKE, E., BOADA, F., "In Vivo Biomicroscopy with Ultrasound 2", Ultrasonics, 1990, pp. 40-49, Vol. 28, No. 1, Butterworth & Co., Guildford, England	

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	SPENCER, T., RAMO, M., SALTER, D., SUTHERLAND, G., FOX, K., MCDICKEN, W., "Characterisation of Atherosclerotic Plaque by Spectral Analysis of 30 MHz Intravascular Ultrasound Radio Frequency Data", IEEE Ultrasonics Symposium Proceedings, 1996, pp. 1073-1076, Vol. 2, Institute of Electrical and Electronics Engineers, New York, U.S.A.	
	SPENCER, T., RAMO, M., SALTER, D., ANDERSON, T., KEARNEY, P., SUTHERLAND, G., FOX, K., MCDICKEN, W., "Characterisation of Atherosclerotic Plaque by Spectral Analysis of Intravascular Ultrasound: An In Vitro Methodology", Ultrasound in Medicine and Biology, 1997, pp. 191-203, Vol. 23, No. 2, Elsevier, New York, U.S.A.	
	TAKIUCHI, S., RAKUGI, H., HONDA, K., MASUYAMA, T., HIRATA, N., ITO, H., SUGIMOTO, K., YANAGITANI, Y., MORIGUCHI, K., OKAMURA, A., HIGAKI, J., OGIHARA, T., "Quantitative Ultrasonic Tissue Characterization Can Identify High-Risk Atherosclerotic Alteration in Human Carotid Arteries", Circulation, 2000, pp. 766-770, Vol. 102, No. 7, American Heart Association, Dallas, U.S.A.	
	TOBOCMAN, W., SANTOSH, K., CARTER, J., HAACKE, E., "Tissue Characterization of Arteries with 4 MHz Ultrasound", Ultrasonics, 1995, pp. 331-339, Vol. 33, No. 4, Elsevier, New York, U.S.A.	
	TORRENCE, C., COMPO, G., "A Practical Guide to Wavelet Analysis", Bulletin of the American Meteorological Society, 1998, pp. 61-78, Vol. 79, No. 1, American Meteorological Society, Boston, U.S.A.	
	TOUSSAINT, J., BRIDAL, S., RAYNAUD, J., FORNES, P., LEBON, V., LEROY-WILLIG, A., BERGER, G., "Magnetic Resonance and Ultrasound Imaging Parameters of Human Aortic and Iliac Atherosclerotic Arteries", 11th International Symposium on Atherosclerosis, 1997, p. 271, Elsevier, New York, U.S.A.	
	VINCE, D., DIXON, K., COTHREN, R., CORNHILL, J., "Comparison of Texture Analysis Methods for the Characterization of Coronary Plaques in Intravascular Ultrasound Images", Computerized Medical Imaging and Graphics, 2000, pp. 221-229, Vol. 24, No. 4, Pergamon Press, New York, U.S.A.	
	WATSON, R., MCLEAN, C., MOORE, M., SPENCER, T., SALTER, D., ANDERSON, T., FOX, K., MCDICKEN, W., "Classification of Arterial Plaque by Spectral Analysis of In Vitro Radio Frequency Intravascular Ultrasound Data", Ultrasound in Medicine and Biology, 2000, pp. 73-80, Vol. 26, No. 1, Elsevier, New York, U.S.A.	
	WEAR, K., WAGNER, R., GARRA, B., "High Resolution Ultrasonic Backscatter Coefficient Estimation Based on Autoregressive Spectral Estimation Using Burg's Algorithm", IEEE Transactions on Medical Imaging, 1994, pp. 500-507, Vol. 13, No. 3, Institute of Electrical and Electronics Engineers, New York, U.S.A.	
	WEAR, K., WAGNER, R., GARRA, B., "A Comparison of Autoregressive Spectral Estimation Algorithms and Order Determination Methods in Ultrasonic Tissue Characterization", IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, 1995, pp. 709-716, Vol. 42, No. 4, Institute of Electrical and Electronics Engineers, New York, U.S.A.	
	WEISS, L., SIBUL, L., "Weighted Time-Frequency and Time-Scale Transforms for Non-Stationary Signal Detection", Proceedings of SPIE – The International Society for Optical Engineering, 1997, pp. 368-377, Vol. 3169, Society of Photo-Optical Instrumentation Engineers, Bellingham, U.S.A.	
	WILSON, L., NEALE, M., TALHAMI, H., APPLEBERG, M., "Preliminary Results from Attenuation-Slope Mapping of Plaque Using Intravascular Ultrasound", Ultrasound in Medicine and Biology, 1994, pp. 529-542, Vol. 20, No. 6, Elsevier, New York, U.S.A.	
	YOSHIDA, K., YOSHIKAWA, J., AKASAKA, T., HOZUMI, T., YAMAURA, Y., SHAKUDO, M., TAKAGI, T., MAEDA, K., OKUMACHI, F., SHIRATORI, K., KOIZUMI, K., MINAGOE, S., "Intravascular Ultrasound Imaging – In Vitro and In Vivo Validation", Japanese Circulation Journal, 1992, pp. 572-577, Vol. 56, No. 6, Japanese Circulation Society, Kyoto, Japan	
	ZHANG, X., DEJONG, S., MCKAY, C., COLLINS, S., SONKA, M., "Automated Characterization of Plaque Composition from Intravascular Ultrasound Images", Computers in Cardiology, 1996, pp. 649-652, Vol. 23, IEEE Computer Society, Long Beach, U.S.A.	
	ZHANG, X., MCKAY, C., , SONKA, M., "Tissue Characterization in Intravascular Ultrasound Images", IEEE Transactions on Medical Imaging, 1998, pp. 889-899, Vol. 17, No. 6, Institute of Electrical and Electronics Engineers, New York, U.S.A.	

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